Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1.   (original) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network to facilitate data transfer between first directors and the second directors with such data passing through the cache memory in the data transfer section.

2.   (original) The system interface recited in claim 1 wherein each one of the first directors includes:

a data pipe coupled between an input of such one of the first directors and the cache memory;

a controller for transferring the messages between the message network and such one of the first directors.

3.   (original) The system interface recited in claim 1 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the second directors.

4.   (original) The system interface recited in claim 2 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the second director.

5.   (original) The system interface recited in claim 1 wherein each one of the first directors includes:

a data pipe coupled between an input of such one of the first directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the first directors and for controlling the data between the input of such one of the first directors and the cache memory.

6.   (original) The system interface recited in claim 1 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the

transfer of the messages between the message network and such one of the second directors and for controlling the data between the input of such one of the second directors and the cache memory.

7.   (original) The system interface recited in claim 5 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the second directors and for controlling the data between the input of such one of the second directors and the cache memory.

8.   (original) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the host computer and the bank of disk drives in response to messages passing between the first directors and the second directors through the messaging network to facilitate the data transfer between host computer/server and the bank of disk drives with such data passing through the cache memory in the data transfer section.

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9.   (original) The system interface recited in claim 8 wherein each one of the first directors includes:

a data pipe coupled between an input of such one of the first directors and the cache memory;

a controller for transferring the messages between the message network and such one of the first directors.

10.   (original) The system interface recited in claim 8 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the second directors.

11.   (original) The system interface recited in claim 9 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the second directors.

12.   (original) The system interface recited in claim 8 wherein each one of the first directors includes:

a data pipe coupled between an input of such one of the first directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the first directors and

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for controlling the data between the input of such one of the first directors and the cache memory.

13. (original) The system interface recited in claim 8 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the second directors and for controlling the data between the input of such one of the second directors and the cache memory.

14. (original) The system interface recited in claim 12 wherein each one of the second directors includes:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the second directors and for controlling the data between the input of such one of the second directors and the cache memory.

15. (original) A method for operating a data storage system adapted to transfer data between a host computer/server and a bank of disk drives, such method comprising:

transferring messages through a messaging network with the data being transferred between the host computer/server and the bank of disk drives through a cache memory, such message network being independent of the cache memory.

16.   (original) A method of operating a data storage system adapted to transfer data between a host computer/server and a bank of disk drives through a system interface, interface comprising: a plurality of first directors coupled to host computer/server; a plurality of second directors coupled to the bank of disk drives; and a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors, such method comprising:

transferring the data between the host computer/server and the bank of disk drives under control of the first and second directors in response to messages passing between the first directors and the second directors through a messaging network to facilitate the data transfer between host computer/server and the bank of disk drives with such data passing through the cache memory in the data transfer section, such message network being independent of the cache memory.

17.   (original) A method of operating a system interface having a plurality of first directors, a plurality of second directors and a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors, such method comprising:

providing a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors to control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network to facilitate data transfer between first directors and the second directors with such data passing through the cache memory in the data transfer section.

18.   (original) The method recited in claim 17 including providing each one of the first directors is provided with:

a data pipe coupled between an input of such one of the first directors and the cache

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memory;

a controller for transferring the messages between the message network and such one of the first directors.

19.   (original) The method recited in claim 17 including providing each one of the second directors with:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the second directors.

20.   (original) The method recited in claim 18 including providing each one of the second directors with:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the second directors.

21.   (original) The method recited in claim 17 including providing each one of the first directors with:

a data pipe coupled between an input of such one of the first directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the first directors and for controlling the data between the input of such one of the first directors and the cache memory.

22.   (original) The method recited in claim 17 including providing each one of the second directors with:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the second directors and for controlling the data between the input of such one of the second directors and the cache memory.

23.   (original) The method recited in claim 21 including providing each one of the second directors with:

a data pipe coupled between an input of such one of the second directors and the cache memory;

a microprocessor; and

a controller coupled to the microprocessor and the data pipe for controlling the transfer of the messages between the message network and such one of the second directors and for controlling the data between the input of such one of the second directors and the cache memory.

24.   (previously presented) The system interface recited in claim 1 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

25.   (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to

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the plurality of first and second directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first directors and second directors, such message network being operative independently of the data transfer section; and

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network to facilitate data transfer between first directors and the second directors with such data passing through the cache memory in the data transfer section.

26.   (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section.

27.   (previously presented) The system interface recited in claim 26 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

28. (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section.

29. (previously presented) The system interface recited in claim 28 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

30. (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors; and

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages

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by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section.

31.   (previously presented). A system interface comprising:

a plurality of directors

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors; and

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section.

32.   (previously presented). The system interface recited in claim 31 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

33.   (previously presented) The system interface recited in claim 31 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

34.   (previously presented) The system interface recited in claim 33 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

35.   (previously presented) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the host computer and the bank of disk drives in response to messages passing between at least a pair of the plurality of first and second directors through the messaging network with such data passing through the cache memory in the data transfer section.

36.   (previously presented) The system interface recited in claim 35 wherein each one of the first and second directors includes:

a data pipe coupled between an input of such one of the first and second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the first and second directors.

37.   (previously presented) The system interface recited in claim 35 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

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38.   (previously presented) The system interface recited in claim 37 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

39.   (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors; and

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section.

40.   (previously presented) The system interface recited in claim 38 wherein each one of the directors include:

a data pipe coupled between an input of such one of the directors and the cache memory;

a controller for transferring the messages between the message network and such one of the directors.

41.   (previously presented) The system interface recited in claim 40 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

42.   (previously presented) The system interface recited in claim 41 wherein each one of
the directors includes:

        a data pipe coupled between an input of such one of the directors and the
cache memory; and

        a controller for transferring the messages between the message network and
such one of the directors.

43.   (previously presented) A system interface comprising:

        a plurality of directors;

        a data transfer section having a cache memory, such cache memory being
coupled to the plurality of directors;

        a messaging network comprising a switch network having a plurality of ports,
each one of the ports being coupled to a corresponding one of the plurality of
directors, such message network being operative independently of the data transfer
section; and

        wherein the directors control data transfer in response to messages passing
between the directors through the messaging network with such data passing through
the cache memory in the data transfer section.

44.   (previously presented) A system interface comprising:

        a plurality of directors;

        a data transfer section having a cache memory, such cache memory being
coupled to the plurality of directors;

        a messaging network, operative independently of the data transfer section,
coupled to the plurality of directors; and

        wherein the directors control data transfer in response to messages passing
between the directors through the messaging network with such messages by-passing
the data transfer section and with such data transfer comprising passing data through the

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directors to the cache memory in the data transfer section.

45. (previously presented) The system interface recited in claim 44 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

46. (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network coupled to the plurality of directors; and

wherein the first and second directors control data transfer in response to messages passing between the directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section.

47. (previously presented) The system interface recited in claim 46 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

48. (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors; and

wherein the directors control data transfer in response to messages passing

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between the directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section.

49. (previously presented). A system interface comprising:

a plurality of directors

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors; and

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section.

50. (previously presented). The system interface recited in claim 49 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

51. (previously presented) The system interface recited in claim 50 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

52. (previously presented) The system interface recited in claim 51 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the

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cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

53.   (previously presented) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the host computer and the bank of disk drives in response to messages passing between at least a pair of the plurality of first and second directors through the messaging network with such data passing through the cache memory in the data transfer section.

54.   (previously presented) The system interface recited in claim 53 wherein each one of the first and second directors includes:

a data pipe coupled between an input of such one of the first and second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the first and second directors.

55.   (previously presented) The system interface recited in claim 54 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

56.   (previously presented) The system interface recited in claim 55 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

57.   (new) A system, comprising:

a first director;

a second director;

a cache memory coupled to the first director and the second director;

a messaging network coupled to the first director and the second director;

wherein the first and second directors control data transfer between first director and the second director with the data in the data transfer passing through the cache memory in response to messages passing between the first director and the second director through the messaging network; and

wherein the messages passing through the message network by-pass the cache memory..

58.   (new) A system, comprising:

a first director;

a second director;

a cache memory;

a messaging network coupled to the first director and the second director;

wherein the first and second directors control data transfer between first director and the second director with data in such data transfer passing through the cache memory in response to messages passing between the first director and the second director through the

messaging network; and

wherein each one of the messages includes a destination field.

59.   (new) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network coupled to the plurality of first directors and the plurality of second directors;

wherein the first and second directors control data transfer between the host computer and the bank of disk drives with data in such data transfer passing through the cache memory in response to messages passing between the first director and the second director through the messaging network; and

wherein the messages passing through the message network by-pass the cache memory.

60.   (new) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a cache memory;

a messaging network coupled to the plurality of first directors and the plurality of second directors; and

wherein the first and second directors control data transfer between the host computer and the bank of disk drives with data in such data transfer passing through the cache memory in response to messages passing between the first director and the second director through the

messaging network; and

wherein each one of the messages includes a destination field.

61.   (new) A system, comprising:

a plurality of first directors;

a plurality of second directors;

a cache memory;

a messaging network, coupled to the plurality of first directors and the

plurality of second directors;

wherein the cache memory is coupled the plurality of first directors and to the

plurality of second directors;

wherein data is transferred between first directors and the second directors

through the cache memory in response to messages passing between the first directors

and the second directors through the messaging network; and

wherein the messages passing through the message network by-pass the cache

memory.

62.   (new) The system recited in claim 61 wherein the each one of the messages comprises a

packet, such packet having a destination field.

63.   (new) A system, comprising:

a plurality of first directors;

a plurality of second directors;

a cache memory;

a messaging network, coupled to the plurality of first directors and the

plurality of second directors;

wherein data is transferred between the first directors and the second directors

through the cache memory in response to messages passing between the first directors

and the second directors through the messaging network; and

wherein each one of the messages comprises a packet, such packet having a destination field.

64.   (new) A system, comprising:

a first director;

a second director;

a cache memory;

a messaging network, coupled to the first director and the second director;

wherein where the cache memory is coupled the first director and to the second director;

wherein data is transferred between the first director and the second director through the cache memory in response to messages passing between the first director and the second director through the messaging network; and

wherein the messages passing through the message network by-pass the cache memory.

65.   (new) The system recited in claim 64 wherein the each one of the messages comprises a packet, such packet having a destination field.

66.   (new) A system, comprising:

a first director;

a second director;

a cache memory;

a messaging network, coupled to the first director and the second director;

wherein data is transferred between the first director and the second director through the cache memory in response to messages passing between the first director

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and the second director through the messaging network; and

wherein each one of the messages comprises a packet, such packet having a destination field.

67.   (new) A system, comprising:

a plurality of directors, each one having a data port for data and a separate message port for messages;

a cache memory coupled to the data ports of the plurality of directors;

a messaging network coupled to the message ports of the plurality of directors;

wherein the plurality of directors control data transfer between the directors with said data in such data transfer passing through the cache memory in response to said messages passing between the directors through the messaging network; and

wherein the messages passing through the message network by-pass the cache memory.

68.   (new) The system recited in claim 67 wherein each one of the messages includes a destination field.

69.   (new) A system, comprising:

a plurality of directors, each one having message port for messages;

a cache memory coupled to the plurality of directors;

a messaging network coupled to the message ports of the plurality of directors;

wherein the plurality of directors control data transfer between the directors with said data in such data transfer passing through the cache memory in response to said messages passing between the directors through the messaging network; and

wherein with messages passing through the message network by-pass the cache memory.

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70.   (new) The system recited in claim 69 wherein each one of the messages includes a destination field.

71.   (new) The system recited in claim 73 wherein each one of the messages includes a destination field.

72.   (new) A system, comprising:a plurality of directors, each one having message port for messages;

a cache memory coupled to the plurality of directors;

a messaging network coupled to the message ports of the plurality of directors;

wherein the plurality of directors control data transfer in response to said messages passing between the directors, each one of said messages including a destination field.

73.   (new) A system, comprising:

a plurality of directors, each one having message port for messages;

a cache memory in communication with the plurality of directors;

a messaging network coupled to the message ports of the plurality of directors;

wherein the plurality of directors control data transfer between the directors with said data in such data transfer passing through the cache memory in response to said messages passing between the directors through the messaging network; and

wherein the messages passing through the message network by-pass the cache memory.

74.   (new) The system recited in claim 73 wherein each one of the messages includes a destination field.

75.   (new) A system, comprising:

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a plurality of directors;

a cache memory in communication the plurality of directors;

a messaging network coupled to the message ports of the plurality of directors;

wherein the plurality of directors control data transfer in response to said messages

passing between the directors, each one of said messages includes a destination field.